REMARKS

The Office Action mailed November 18, 2005, has been received and reviewed. Claims 1 through 42 are currently pending in the application, of which claims 1 through 3, 7 through 9, 11 through 17, 19 through 21, 25 through 27, 29 through 35, and 37 through 42 are currently under examination. Claims 4 through 6, 10, 18, 22 through 24, 28, and 36 are withdrawn from consideration as being drawn to a non-elected species. Claims 1 through 3, 7 through 9, 11 through 17, 19 through 21, 25 through 27, 29 through 35, and 37 through 42 stand rejected. Applicants have amended claims 1, 14, 19, 32, and 37 and respectfully request reconsideration of the application as amended herein.

Supplemental Information Disclosure Statement

Please note that a Supplemental Information Disclosure Statement was filed herein on November 18, 2005, and was not considered prior to issuance of the outstanding Office Action of November 18, 2005. Applicants respectfully request that the information cited on the PTO/SB/08A be made of record herein and that an initialed copy of the PTO/SB/08A evidencing consideration of the cited references be returned to the undersigned attorney.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 5,719,440 to Moden in view of Microelectronics Packaging Handbook Semiconductor Packaging Part II, 2nd Ed., Chapman and Hall, 1997, pages 25-26, 42-44, 91-93, 887-890 to Tummala et al.

Claims 1 through 3, 11, 14 through 17, 19 through 21, 29, 32 through 35, 37 through 38, and 40 through 41 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Moden (U.S. Patent No. 5,719,440) in view of Tummala et al. (Microelectronics Packaging Handbook Semiconductor Packaging Part II, 2nd Ed., Chapman and Hall, 1997, pages 25-26, 42-44, 91-93, 887-890). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Applicants respectfully assert that claims 1 through 3, 11, 14 through 17, 19 through 21, 29, 32 through 35, 37 through 38, and 40 through 41 could not have been obvious to a person of ordinary skill in the art at the time the inventions were made considering Moden in view of Tummala et al. because Moden and Tummala et al., when combined, do not teach or suggest "a volume of dielectric filler material disposed between adjacent spaced adhesive elements in [a] standoff volume and bonding [a] semiconductor substrate to [a] carrier substrate, wherein the dielectric filler material fills a majority of the standoff volume" (as recited in independent claims 1 and 19 as currently amended), or "a volume of dielectric filler material disposed between adjacent mutually spaced elements in [a] standoff volume, wherein [a] semiconductor substrate is attached to [a] carrier substrate primarily by the volume of dielectric filler material" (as recited in independent claim 37 as currently amended).

Moden teaches, with reference to Figure 3, "a wire body style/flip chip attach assembly 300" that includes a semiconductor die 12 having a lower surface 14 bonded to an upper surface 20 of an adaptor board 18 with "an insulating, sealing adhesive 40." Moden, column 4, lines 58-59; column 5, lines 1-3. Wire bonds 134 extend between the bond pads 38 on the lower surface 14 of the semiconductor die 12 and bond pads 39 on a lower surface 24 of the adaptor board 18 through a wire bond via 42 in the adaptor board 18. Id., column 5, lines 3-10. "A sealant 44 encases the bond wires 134 and seals the wire bond via 42 to prevent contamination and damage to the wire bonds." Id., column 5, lines 15-17. As asserted by the Examiner at Page 3 of the outstanding Office Action, Moden teaches a plurality of spaced adhesive elements 40 and a volume of filler material 44. As clearly seen in Figure 3 of Moden, the adhesive elements 40 substantially fill the standoff between the semiconductor die 12 and the adaptor board 18. The

filler material 44 occupies only a small space between the semiconductor die 12 and the adaptor board 18 near the wire bond via 42.

Moden clearly does not teach or suggest that the filler material 44 fills a majority of the standoff volume between the semiconductor die 12 and the adaptor board 18. Furthermore, Moden does not teach or suggest that the semiconductor die 12 is attached to the adaptor board 18 primarily by the sealant 44.

Tummala et al. teaches an electronic system that includes a semiconductor assembly coupled to at least one of a processor device, an input device, and an output device. Tummala et al., section 7.2.2.1; Figure 7-20. Furthermore, Tummala et al. teaches sealing and encapsulating a semiconductor assembly with materials including silicones, epoxies, glasses, and metals. Tummala et al., section 14.4; Figure 14-5.

Tummala et al. does not teach or suggest, however, that any such material is disposed between adjacent spaced adhesive elements in a standoff volume, or that a majority of a standoff volume between a semiconductor substrate and a carrier substrate is filled with such material. Furthermore, Tummala does not teach or suggest that a semiconductor substrate may be attached to a carrier substrate primarily by such materials.

As Moden and Tummala et al., when combined, do not teach or suggest each of the elements and limitations recited in any one of independent claims 1, 19, and 37 as currently amended, Applicants respectfully assert that independent claims 1, 19, and 37 could not have been obvious to a person of ordinary skill in the art at the time the inventions were made considering Moden in view of Tummala et al., and request that the Examiner withdraw the rejection of independent claims 1, 19, and 37 under 35 U.S.C. § 103(a).

A dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* MPEP § 2143.03. As a result, the nonobviousness of independent claim 1 precludes a rejection of dependent claims 2, 3, 11, and 14 through 17, the nonobviousness of independent claim 19 precludes a rejection of dependent claims 20, 21, 29, and 32 through 35, and the nonobviousness of independent claim 37 precludes a rejection of dependent claims 38, 40, and 41. Therefore, Applicants respectfully request that the Examiner withdraw the 35 U.S.C. § 103(a) obviousness rejection to dependent

claims 2, 3, 11, 14 through 17, 20, 21, 29, 32 through 35, 38, 40, and 41, in addition to independent claims 1, 19, and 37.

Regarding dependent claims 14 and 32, Applicants additionally assert that none of the prior art references teach or suggest a semiconductor device assembly wherein "dielectric filler material substantially fills [a] standoff volume" between a semiconductor substrate and a carrier substrate, as recited in dependent claims 14 and 32. As previously discussed herein, the adhesive elements 40 described by Moden substantially fill the standoff between the semiconductor die 12 and the adaptor board 18. The filler material 44 occupies only a small space between the semiconductor die 12 and the adaptor board 18 near the wire bond via 42. Moden clearly does not teach or suggest that the filler material 44 substantially fills the standoff volume between the semiconductor die 12 and the adaptor board 18. Moreover, Tummala et al. does not teach or suggest dielectric filler material that substantially fills a standoff volume between a semiconductor substrate and a carrier substrate. The Examiner asserts at Page 4 of the outstanding Office Action that Moden teaches "that the dielectric filler material (44) substantially fills a standoff ... between the semiconductor substrate (12) and the carrier substrate (18)." Claims 1 and 19 have been amended to recite that the spaced adhesive elements are also disposed in the standoff volume. Moden does not teach or suggest a standoff volume that includes spaced adhesive elements and that is substantially filled by a dielectric filler material. Therefore, Applicants respectfully assert that dependent claims 14 and 32 could not have been obvious to a person of ordinary skill in the art at the time the inventions were made considering Moden in view of Tummala et al., and request that the Examiner withdraw the rejection of dependent claims 14 and 32 under 35 U.S.C. § 103(a) for this additional reason.

Obviousness Rejection Based on U.S. Patent No. 5,719,440 to Moden in view of Microelectronics Packaging Handbook Semiconductor Packaging Part II, 2nd Ed., Chapman and Hall, 1997, pages 25-26, 42-44, 91-93, 888-890 to Tummala et al., and further in view of U.S. Patent No. 6,359,334 to Jiang.

Claims 7 through 9 and 25 through 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Moden (U.S. Patent No. 5,719,440) in view of Tummala et al.

(Microelectronics Packaging Handbook Semiconductor Packaging Part II, 2nd Ed., Chapman and Hall, 1997, pages 25-26, 42-44, 91-93, 888-890, and further in view of Jiang (U.S. Patent No. 6,359,334 B1). Applicants respectfully traverse this rejection, as hereinafter set forth.

Each of claims 7 through 9 depends either directly or indirectly from independent claim 1 and includes each of the elements and limitations recited in claim 1. Similarly, each of claims 25 through 27 depends either directly or indirectly from independent claim 19 and includes each of the elements and limitations recited in claim 19.

Applicants respectfully assert that claims 7 through 9 and 25 through 27 could not have been obvious to a person of ordinary skill in the art at the time the inventions were made considering the cited prior art references because, when combined, the cited prior art references do not teach or suggest "a volume of dielectric filler material disposed between adjacent spaced adhesive elements in [a] standoff volume and bonding [a] semiconductor substrate to [a] carrier substrate, wherein a majority of the standoff volume is filled by the dielectric filler material," as recited in independent claims 1 and 19 as currently amended.

As previously discussed herein, Moden and Tummala et al., when combined, do not teach or suggest a semiconductor assembly that includes a volume of dielectric filler material disposed between adjacent spaced adhesive elements in a standoff volume and bonding a semiconductor substrate to a carrier substrate, wherein a majority of the standoff volume is filled by the dielectric filler material. The teachings of Jiang do not satisfy the deficiency.

Jiang teaches a semiconductor die 38 that is attached to a substrate 24 by strips of thermally conductive adhesive tape 10a and 10b, which are disposed in a standoff volume between the semiconductor die 38 and the substrate 24. Jiang, column 3, lines 43-44, and 53-56; Figure 2. As seen in Figure 2 of Jiang, the strips of thermally conductive adhesive tape 10a and 10b are mutually separate and discrete from each other, and are positioned laterally adjacent, and extend substantially parallel to an opening 26 in the substrate 24. As clearly seen in Figure 2 in Jiang, a majority of the standoff volume between the semiconductor die 38 and the substrate 24 is filled by the strips of thermally conductive adhesive tape 10a and 10b.

Jiang does not teach or suggest a semiconductor assembly that includes a volume of dielectric filler material disposed between adjacent spaced adhesive elements in a standoff

volume and bonding a semiconductor substrate to a carrier substrate, wherein a majority of the standoff volume is filled by the dielectric filler material.

As Moden, Tummala et al., and Jiang, when combined, do not teach or suggest each of the elements and limitations of any one of dependent claims 7 through 9 and 25 through 27, Applicants respectfully assert that dependent claims 7 through 9 and 25 through 27 could not have been obvious to a person of ordinary skill in the art at the time the inventions were made considering Moden, Tummala et al., and Jiang and request that the Examiner withdraw the rejection of dependent claims 7 through 9 and 25 through 27 under 35 U.S.C. § 103(a).

Obviousness Rejection Based on U.S. Patent No. 5,719,440 to Moden in view of Microelectronics Packaging Handbook Semiconductor Packaging Part II, 2nd Ed., Chapman and Hall, 1997, pages 25-26, 42-44, 91-93, 888-890 to Tummala et al., and further in view of U.S. Patent No. 5,561,329 to Mine et al.

Claims 12 through 13, 30 through 31, 39, and 42 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Moden (U.S. Patent No. 5,719,440) in view of Tummala et al. (Microelectronics Packaging Handbook Semiconductor Packaging Part II, 2nd Ed., Chapman and Hall, 1997, pages 25-26, 42-44, 91-93, 888-890), and further in view of Mine et al. (U.S. Patent No. 5,561,329). Applicants respectfully traverse this rejection, as hereinafter set forth.

Applicants respectfully assert that claims 12 through 13, 30 through 31, 39, and 42 could not have been obvious to a person of ordinary skill in the art at the time the inventions were made considering the cited prior art references because, when combined, the cited prior art references do not teach or suggest "a volume of dielectric filler material disposed between adjacent spaced adhesive elements in [a] standoff volume and bonding [a] semiconductor substrate to [a] carrier substrate, wherein a majority of the standoff volume is filled by the dielectric filler material" (as recited in independent claims 1 and 19 as currently amended), or "a volume of dielectric filler material disposed between adjacent mutually spaced elements in [a] standoff volume, wherein [a] semiconductor substrate is attached to [a] carrier substrate primarily by the volume of dielectric filler material" (as recited in independent claim 37 as currently amended).

As previously discussed herein, Moden and Tummala et al., when combined, do not teach

or suggest a semiconductor assembly that includes a volume of dielectric filler material disposed between adjacent spaced adhesive elements in a standoff volume and bonding a semiconductor substrate to a carrier substrate, wherein a majority of the standoff volume is filled by the dielectric filler material, or a semiconductor substrate attached to a carrier substrate primarily by a volume of dielectric filler material. The teachings of Mine et al. do not satisfy the deficiency.

Mine et al. teaches (with reference to Figure 1) a semiconductor assembly in which a semiconductor element 1 is attached to a tab 2. A surface of the semiconductor element 1 is coated with a cured protectant composition 6, and the semiconductor element 1 is additionally resin-sealed with a cured epoxy resin 7 for sealing semiconductor elements. Mine et al., column 2, lines 28-32. The cured protectant composition 6 is used to provide "highly moisture resistant and highly heat-resistant" semiconductor devices. Id., column 1, lines 12-13. Figure 1 of Mine et al. shows the protectant composition 6 covering a portion of the bond wires 5, while the remaining portions of the bond wires 5 are covered by the cured epoxy resin 7.

Mine et al. does not teach or suggest, however, that the protectant composition 6 or the cured epoxy resin 7 is disposed between adjacent spaced adhesive elements in a standoff volume between the semiconductor element 1 and the tab 2, or that a majority of a standoff volume between the semiconductor element 1 and the tab 2 is filled by the protectant composition 6 or the cured epoxy resin 7.

As Moden, Tummala et al., and Mine et al., when combined, do not teach or suggest each of the elements and limitations of any one of dependent claims 12 through 13, 30 through 31, 39, and 42, Applicants respectfully assert that dependent claims 12 through 13, 30 through 31, 39, and 42 could not have been obvious to a person of ordinary skill in the art at the time the inventions were made considering Moden, Tummala et al., and Mine et al. and request that the Examiner withdraw the rejection of dependent claims 12 through 13, 30 through 31, 39, and 42 under 35 U.S.C. § 103(a).

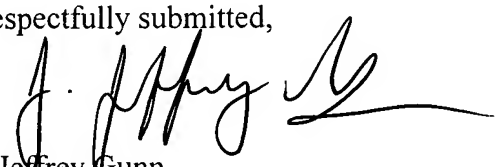
ENTRY OF AMENDMENTS

The amendments to claims 1, 14, 19, 32, and 37 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application.

CONCLUSION

Claims 1 through 42 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, the Examiner is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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